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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------|------------------|
| 10/721,773 | 11/25/2003 | Daniel F. Handman | 3586.1000-001 | 4185 |
| 21005 | 7590 | 09/15/2005 | | |
| HAMILTON, BROOK, SMITH & REYNOLDS, P.C. 530 VIRGINIA ROAD P.O. BOX 9133 CONCORD, MA 01742-9133 | | | EXAMINER CHISDES, SARAH J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2877 | |

DATE MAILED: 09/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/721,773

Applicant(s)

HANDMAN ET AL.

Examiner

Sarah J. Chisdes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20,40 and 43-46 is/are allowed.
- 6) ☒ Claim(s) 1-10,12,14,15,17,19,21-30,32,34,35,37,39,41 and 42 is/are rejected.
- 7) ☒ Claim(s) 11,13,16,18,31,33,36 and 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/29,10/7,10/29/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

The examiner acknowledges a claim for priority due to provisional application 60/452,745 filed on March 7, 2003.

Information Disclosure Statement

The Information Disclosure Statements filed on March 29, October 7, and October 29, 2005 have been received and entered of record in the file. Initialed, signed and dated copies of all six pages accompany this office action.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the focusing device of claims 9 and 29 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

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application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 37 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 37 recites the limitation "the first radiation source" in line 12. There is insufficient antecedent basis for this limitation in the claim. In line 3, the claim specifies "emitting a first beam from a second electromagnetic radiation source". The examiner assumes that the word "second" in this line was intended to be "first", since line 8 specifies a "second beam from a second electromagnetic radiation source." If the word "second" in line 3 is replaced by the word "first", there is antecedent basis for the "first radiation source" in line 12. The examiner assumes the word "first" was intended in line 3 and has examined the claim accordingly.

Claim 39 recites the limitation "the second beam" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 39 depends on claim 36, which is dependent on claim 21. Claim 21 only specifies one beam of electromagnetic radiation. If claim 39 were to depend on claim 37, there would be antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-8, 12, 14-15, 17, 19, 21-22, 24-28, 32, 34-35, 37, 39, and 41-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Tull (US 5,361,854).

Regarding claims 1, 2, and 4, Tull discloses a laser unit (element 84 of figures 4 and 5) to be attached to the object whose deformation is to be measured in column 5 line 40, and a target (column 5 line 60-62), also attached to the object, comprising an array of photosensitive elements (sensors) arranged in a grid, so that a processor can interpret the signals and determine the position of the beam (column 6 lines 10-16). Tull does not explicitly disclose that the laser beam has a shape, but all laser beam have an inherent shape. Tull thereby meets all the limitations of claims 1 and 2, and the laser acting as an electromagnetic radiation source, meets the limitation of claim 4.

As to claim 5, Tull discloses in column 5 line 45, that the laser is preferably a laser diode, thereby meeting the limitation of the claim.

Tull discloses a first laser unit (element 84) and a second laser unit (element 86) in column 5 lines 40-41, thereby meeting the limitation of claim 6 that the electromagnetic radiation source comprise at least two radiation sources.

In column 6 line 64 through column 7 line 13, Tull discloses the method whereby data from the sensors is processed to determine the bend and twist of the object, thereby meeting the limitations of claim 7.

The limitation of the array of radiation sensors being non-linear of claim 8 is met by the target described in column 5 lines 60-62 as an array of sensor elements arranged in a grid. A grid is two-dimensional and therefore is non-linear.

The second electromagnetic radiation source of claim 12 has already been met, as explained above in regard to claim 6. The second array of sensors is disclosed by Tull in column 5 lines 52-53.

The limitation of claim 14 that the beams of electromagnetic radiation be substantially co-directed are met by Tull in Figure 2, where it can be seen that beam 90b and beam 90c are substantially co-directed. Likewise the limitation of claim 15 that the beams be substantially counter directed is met by Tull in Figure 2, where it can be seen that beams 90b and 88a are substantially counter-directed.

Claim 17 contains the limitations of claim 1 and 12, which are rejected as anticipated by Tull as set forth above, and adds the limitation that the second light source be axially displaced along a length of the object from the first light source. In Figure 2, it can be seen that light source F (the second one from the left) which emits beam 90b is axially displaced along the length of the object from light source E (the first one from the left) which emits beam 88a. These two beams, 90b and 88a, are substantially counter-directed, thereby meeting the limitation of claim 19.

Claims 21, 22, 24-28, 32, 34, 35, 37, and 37 speak to the method of using the apparatus of claims 1, 2, 4-8, 12, 14, 15, 17, and 19, respectively, and are therefore not patentably distinct

from the apparatus claims. These claims are rejected as anticipated by Tull for the reasons set forth above.

Claims 41 and 42 are apparatus claims specifying a means for providing the elements of claims 1 and 17, respectively, and are therefore not patentably distinct from claims 1 and 17.

These claims are rejected as anticipated by Tull for the reasons set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tull as applied to claims 1 and 21 above, and further in view of Stirland et al. (US 3,723,013). Tull discloses all the elements of claims 1 and 21, but fails to disclose that the shaped beam has an "X" or cross-shaped cross section, as specified by claims 3 and 23. Stirland teaches an alignment system which uses a beam with a cross-shaped cross section as seen in Figures 3 and 11, to determine the relative position of the objects in question. It would have been obvious to one of ordinary skill in the art at the time of invention to use the cross-shaped beam of Stirland in the positioning system of Tull in order to more accurately determine the position of the beam on the array of detectors.

Claims 9 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tull as applied to claims 1 and 21 above, and further in view of Toshio (JP 60006811). Tull discloses all the elements of claims 1 and 21, but fails to disclose a focusing device between the light source

and the array of sensors, as specified in claims 9 and 29. Toshio teaches the use of a lens (element 10 of Figure 3) to focus a light beam on an array of detectors in a device used to measure the deflection of a beam to indicate distortion in an object. It would have been obvious to one of ordinary skill in the art at the time of invention to use the lens of Toshio in the positioning system of Tull in order to focus the beam more precisely on the array of detectors and to more accurately determine the position of the beam on detectors, and hence to more accurately determine the bend or twist of the object.

Claims 10 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tull as applied to claims 1 and 21 above, and further in view of Pund (US 5,592,285). Tull discloses all the elements of claims 1 and 21, but fails to disclose the specific wavelength of light that is used. Claims 10 and 30 specify that the electromagnetic radiation be infrared, visible, or ultraviolet. Pund discloses a device for determining the relative position of a light source and a sensor, and teaches that a laser diode can be used as the light source (column 1 lines 50-52), and that the optical radiation for use in the device can be in the range from deep ultraviolet to long wavelength infrared (column 1 lines 9-13), which includes visible light. It would have been obvious to one of ordinary skill in the art at the time of invention to use a laser diode emitting light in the wavelength range specified by Pund in the apparatus of Tull in order to produce a light beam that would enable the apparatus to function in a variety of applications.

Allowable Subject Matter

Claims 20, 40, and 43-46 are allowed.

Claims 11, 13, 16, 18, 31, 33, 36, and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 11, 13, 18, 20, 31, 33, 38, 40, and 43, the prior art of record taken alone or in combination fails to disclose an apparatus for determining changes in the shape of an object together with the limitations of the independent claims and intervening claims where the object whose shape is to be determined is a blade. Moir (US Re. 33,097) determines the shape of a blade but not in the manner claimed in the present application.

Regarding claims 16, 36, and 44-46, the prior art of record taken alone or in combination fails to disclose an apparatus for determining changes in the shape of an object together with the limitations of the independent claims and intervening claims where the change in shape of the object is indicative of fluid flow around the object. Alexander (US 3,681,983) determines the fluid flow around an object by deflecting an object, but does not use a light beam to determine the deflection of the object as claimed in the present application.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure is Pavlin et al. (US 4,798,461) and Gabriel et al. (US 4,730,928).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah J. Chisdes whose telephone number is 571-272-8540. The

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examiner can normally be reached on 8am -5:30pm Monday through Thursday and 8am-4:30pm on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ljc
S.J. Chisdes, Ph.D.
September 7, 2005


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
2005